

**Research, Engineering and Development Advisory Committee (REDAC)
Holiday Inn Rosslyn Westpark Hotel
1900 North Fort Meyer Drive, Arlington, VA
Meeting Minutes**

September 30-October 1, 2002

On September 30 and October 1, 2002, the Federal Aviation Administration's (FAA) Research, Engineering and Development Advisory Committee (REDAC) met at the Holiday Inn Rosslyn Westpark Hotel in Arlington, Virginia. Attachments 1 and 2 provide the meeting agenda and attendance, respectively.

Monday, September 30

Welcome and Introductory Remarks

REDAC Chair, Dr. Deborah Boehm-Davis, and FAA's Director of Aviation Research, Dr. Herman Riediess, welcomed members and visitors. After reading the public meeting announcement, Dr. Riediess welcomed the new members: Ms. Thella Bowens; Dr. John-Paul Clarke; Ms. Sarah Dalton; and Dr. Colin Drury. Dr. Jeremiah Creedon will also replace Mr. Sam Venneri, and Mr. Amr El Sawy will serve as a non-voting member. Mr. John Kern has accepted a position at the FAA and will be retiring from the Committee.

Charles Keegan Remarks

Mr. Charles Keegan, FAA Associate Administrator for Research and Acquisitions, encouraged the members to continue to help FAA leverage the "intellectual property" available within the U.S. aviation community, and said that the FAA needs to direct its R&D programs to better prepare for the future. He described the agency's Operational Evolution Plan (OEP) as a "relatively near-term plan" that provides no direction for FY 2007 and beyond. Mr. Keegan believes "bold ideas" are needed to bridge from the OEP to the technologies and procedures that will create the NAS of the future.

Mr. Keegan presented a chart showing his view of the relationships between the REDAC and various other advisory groups that influence the agency's overall R&D commitments. He said the REDAC is the best-suited group to provide the long-term vision of advanced opportunities that the FAA needs to meet safety and capacity requirements in the future.

Meeting Process and Objectives

Dr. Herman Riediess updated the Committee on the budget status for the next 3 years. He noted that lack of focus made recent "above-target" research proposals fail to attract funding. Rather than to propose diverse projects for the upcoming years, FAA will collaborate with NASA in a focused effort called the 21st Century Aviation Initiative.

Paul Galis Remarks

Mr. Paul Galis, FAA Deputy Associate Administrator for Airports, outlined possible advantages to transferring R&D funds from the Facilities and Equipment (F&E) Appropriation to the Airport

Improvement Program (AIP). Discussion followed regarding the transfer of money by Congress between various aviation funds in recent years.

Mr. Jim White, FAA, described the status of research into runway incursion, the Pavement Test Facility at the FAA Tech Center, wildlife hazard mitigation, and preparations to accommodate the new Airbus-380.

Jim Washington Remarks

Mr. Jim Washington, FAA Director of the Air Traffic System Requirements Service, briefly described the agency's R&D strategy, size of its budget, and its shared research interests with NASA, Volpe, DoD, MIT, and EUROCONTROL. Some research priorities include runway safety, increased arrival-departure rates, en route capacity, greater NAS flexibility, and weather/human factors work.

Members discussed ways to incorporate the Small Aircraft Transportation System (SATS) into future air traffic control (ATC) plans.

Aviation Communications Research and Technology (ACRT)

Mr. John Kern provided an update on the progress of the Aviation Communications Research & Technology (ACRT) Working Group. The ACRT is a subgroup of the Air Traffic Services Subcommittee. The ACRT held five meetings and received briefings from a wide range of experts. The group is working on a report recommending aviation communications research investments for FAA. Mr. Kern previewed elements of the upcoming report including the need for global harmonization, a request for industry to focus on several concepts of operations, and the requirement for a true communications plan rather than a general research plan. The report will be presented to the REDAC at the 2003 spring meeting.

Louise Maillett Remarks

Ms. Louise Maillett, Acting Assistant Administrator for Policy, Planning and International Aviation, commented on the collaborative role the United States plays in global aviation. In discussion that followed, members noted that, despite impressive international cooperation, decisions to "compete or cooperate" with the Europeans continue to pose a challenge to the U.S. aviation community.

Subcommittee Recommendations

In February and March 2002, the REDAC subcommittees reviewed current R&D investments and made recommendations on their respective portions of the FAA's portfolio. The Chairman (listed below) of each subcommittee presented recommendations to the Committee. Attachment 3 reflects the subcommittee presentations.

Subcommittee on Air Traffic Services – Mr. John Kern
Subcommittee on Aircraft Safety – Dr. Hans Weber (for Dr. Louis Mancini)
Subcommittee on Airports – Mr. Richard Marchi
Subcommittee on Environment and Energy – Dr. John-Paul Clarke
Subcommittee on Human Factors – Dr. John Hansman

Mr. John Klinkenberg, Security Subcommittee Chairman, provided an update on the Subcommittee's activities with the new Transportation Security Agency (TSA).

Small Aircraft Transportation System (SATS)

Mr. Ron Swanda discussed the status of the SATS Subcommittee, which serves both the REDAC and its NASA counterpart, the ATAC. Various complications have prevented the Subcommittee from meeting, and approval of its Terms of Reference has been postponed until the REDAC's Spring Meeting in 2003. Mr. Swanda stated a non-profit organization has been formed to support the SATS research effort, but lack of research funding and apparent duplication of effort among the four contributing consortia remain to be resolved. On the NASA side, the SATS Subcommittee would report to the Revolutionizing Aviation Subcommittee, which would report to the ATAC. Mr. Swanda added that he would like to broaden the group's scope to reflect the tendency of SATS to crosscut aviation activities such as capacity and mobility and the importance of engine research technologies to the program. He invited REDAC members interested in serving on the subcommittee to contact him and requested that a statement be included in the REDAC letter to the FAA Administrator stressing the importance of SATS.

Day 2 - October 1

FAA Response to Committee Recommendations

Dr. Herm Rediess, presented FAA's information response to recommendations from the Committee's July 11, 2002, letter to the FAA Administrator. A formal response is being prepared.

Committee Discussion of Recommendations

Dr. Deborah Boehm-Davis reviewed three recurring elements that were heard from the previous day's discussion: setting aside funds specifically to support "longer-term" research; inviting input from the aviation community at the stage when PPTs' are defining their project and formulating their research goals; and bridging the "vision" gap between near-term OEP issues and long-term research directions.

Additional discussion took place on the following topics.

- Commit not to particular technologies, but to a vision of what the future will look like. Then allow that vision to help drive research needs. The "Army after next" concept of the U.S. Army might provide a model.
- Encourage the FAA to exercise strong leadership in selecting elements from among the various visions for the future of aviation that now exist within the community. Recognize the importance, but also the limitations, of consensus when choices must be made.
- Use principles from systems engineering, systems architecting, systems design, and systems analysis in planning for the future so that anticipated "characteristics of the future air transportation system," and the requirements these characteristics place on the system, largely determine "the type of research that we need to do in order to fine tune the details of the system."

- Recognize the value of a vision of the future, “push very hard at the early steps, moving in that direction,” but recognize that the future may actually turn out differently.

The Committee’s final recommendations were forwarded to the FAA Administrator on December 3, 2002. (Attachment 4)

Joint Meeting
FAA’s Research, Engineering and Development Advisory Committee (REDAC)
NASA’s Aerospace Technology Advisory Committee (ATAC)
Day 2 - October 1, 2002

Opening Remarks

Co-Chairs Dr. Deborah Boehm-Davis (REDAC) and Mr. David Swain (ATAC) welcomed members for the joint meeting. Mr. Charles Keegan, FAA’s Associate Administrator for Research and Acquisitions, stressed the value of this collaboration for aviation research. Dr. Jeremiah Creedon, NASA’s Associate Administrator for Aerospace Technology, spoke of the need for researchers of both agencies to stay focused on the important role of aviation in the nation’s economy.

U.S. Aerospace Leadership

Mr. John Kern commented on U.S. aerospace leadership and the impacts of the European Vision 2020 document. Mr. Kern believes we must modernize our aviation system through bold ideas and one coherent plan for the future. The current Operational Evolution Plan (OEP), which retains a near-term focus, does not provide the needed forward-thinking vision of the aviation system for the years beyond 2010.

NAS Operational Evolution Plan and Beyond

Mr. Duane Dupon, (FAA) described the work of the OEP. The latest formal Plan, Version C, is scheduled for publication in December 2002. Several members from the REDAC and ATAC commented on the need for: having a vision with bold ideas; “moving the metrics” to reflect greater success; and an expanded research environment.

NASA Enterprise Strategy

Dr. Jeremiah Creedon described the challenging opportunity aviation researchers face to improve our national quality of life by increasing safety, capacity, and mobility while still reducing emissions and noise.

Discussion concentrated on goals. Members questioned whether NASA’s goals are the same as those of the FAA. Dr. Creedon and Mr. Keegan agreed on the need for a mechanism to tie the goals of both agencies to broad national goals, such as the goal of the Department of Transportation to reduce aircraft transportation fatalities by 80% over a 10-year period.

VAMS/21st Century Aviation Initiative System Planning

Dr. Herman Rediess (FAA) and Mr. Bob Jacobsen (NASA) described the emerging joint VAMS/21st Century Aviation Initiative in terms that frequently resembled suggestions from speakers and from the floor during this 2-day meeting. Elements of this strategy include:

- Provide guidance beyond the timeframes of the OEP.
- Agree upon a vision that will guide R&D efforts (selection/development of technologies).
- Incrementally improve the NAS without loss of service.
- Rely upon a “systems of systems” (systems engineering) planning approach.
- Incorporate diverse social factors, goals, and user’s needs into mission requirements.

Future Directions in Joint FAA and NASA Cooperation

Mr. Charles Keegan and Dr. Jeremiah Creedon reiterated their commitment to working together to build a more effective collaboration between their agencies with ongoing input from the aviation community.

NASA’s Potential Contributions to Aviation Security

Mr. Robert Pearce (NASA) presented his perception of NASA’s role in aviation security. He stated NASA’s willingness to help the Transportation Security Administration (TSA) meet its near-term needs for technologies with security applications. He stressed NASA’s applicable expertise, particularly in the area of sensors.

Joint Committee Discussion

Discussion included:

- A proposal for the agencies to develop a joint vision on the aviation system of the future.
- Expressions of hope that the new leadership in both FAA and NASA would facilitate a better, more forward-looking research relationship between the agencies. The Chairs agreed to work toward a combined meeting schedule that allows joint sessions such as this to continue at least once per year.
- Agreement of the Co-Chairs to pursue holding a joint meeting of the REDAC and ATAC once per year at a time that would provide meaningful input to budget processes.

Dr. Boehm-Davis thanked the members of both committees for attending the meeting.

Adjourn

The meeting was adjourned at 4:30 p.m.

Attachment 1

**Research, Engineering & Development Advisory Committee (REDAC)
Holiday Inn Rosslyn Westpark Hotel
1900 North Fort Myer Drive, Arlington, VA
(703) 807-2000 FAX: (703) 522-7480**

September 30 - October 1, 2002

AGENDA

Day 1 – September 30

9:00 a.m. – 9:30 a.m.	Welcome and Introductory Remarks -Welcome Thella Bowens John-Paul Clarke Colin Drury Sarah Dalton Jeremiah Creedon	Dr. Deborah Boehm-Davis, Chair Dr. Herman Riediess, FAA
9:30 a.m. – 9:45 a.m.	Remarks	Mr. Charles Keegan, FAA
9:45 a.m. – 10:00 a.m.	Meeting Process and Objectives - FY 2003 and FY 2004 Budget Update	Dr. Herman Riediess, FAA
10:00 a.m. – 11:00 a.m.	Associate Administrators Remarks	Mr. Paul Galis, FAA
11:00 a.m. – 11:15 a.m.	BREAK	
11:15 a.m. – 12:00 p.m.	Report Approval - Aviation Communications Research Investments	Mr. John Kern
12:00 p.m. – 1:00 p.m.	LUNCH	
1:00 p.m. – 1:30 p.m.	International Aviation	Ms. Louise Maillett, FAA
	Subcommittee Recommendations	
1:30 p.m. – 2:00 p.m.	Subcommittee on Environment & Energy	Dr. John-Paul Clarke
2:00 p.m. – 2:30 p.m.	Subcommittee on Human Factors	Dr. John Hansman
2:30 p.m. – 3:00 p.m.	Subcommittee on Airports	Mr. Richard Marchi
3:00 p.m. – 3:15 p.m.	BREAK	
3:15 p.m. – 3:45 p.m.	Subcommittee on Aircraft Safety	Dr. Louis Mancini
3:45 p.m. – 4:15 p.m.	Subcommittee on Air Traffic Services	Mr. John Kern
4:15 p.m. – 4:45 p.m.	Subcommittee on Security	Mr. John Klinkenberg

5:10 p.m. Adjourn

Day 2 – October 1

10:00 a.m.	Reconvene Meeting	Dr. Deborah Boehm-Davis, Chair Dr. Herman Riediess, FAA
10:05 a.m. – 10:30 a.m.	FAA Response to Committee Recommendations	Dr. Herman Riediess, FAA
10:30 a.m. – 11:00 a.m.	Small Aircraft Transportation System (Ad hoc Subcommittee)	Mr. Ron Swanda
11:00 a.m. – 12:00 p.m.	Committee Discussion on Recommendations	Dr. Deborah Boehm-Davis, Chair
12:00 p.m. – 1:00 p.m.	LUNCH	

**Joint Meeting
FAA Research, Engineering and Development Advisory Committee (REDAC)
NASA Aerospace Technology Advisory Committee (ATAC)**

1:00 p.m. - 1:30 p.m.	Opening Remarks	Dr. Deborah Boehm-Davis, REDAC Chair Mr. David Swain, ATAC Chair Mr. Charles Keegan, FAA Dr. Jeremiah Creedon, NASA
1:30 p.m. – 1:50 p.m.	U.S. Aerospace Leadership – Impact of European Vision 2020 and Initiative	Mr. John Kern, REDAC
1:50 p.m. – 2:10 p.m.	NAS Operational Evolution Plan and Beyond	Mr. Charles Keegan, FAA
2:10 p.m. – 2:40 p.m.	NASA Enterprise Strategy	Dr. Jeremiah Creedon, NASA
2:40 p.m. – 3:00 p.m.	VAMS/21 st Century Aviation System Planning	Dr. Herman Riediess, FAA Mr. Robert Jacobsen, NASA
3:00 p.m. – 3:20 p.m.	Future Directions in Joint FAA and NASA Cooperation	Mr. Charles Keegan, FAA Dr. Jeremiah Creedon, NASA
3:20 p.m. – 3:35 p.m.	Break	
3:35 p.m. – 4:05 p.m.	Discussion	Dr. Deborah Boehm-Davis, REDAC Chair Mr. David Swain, ATAC Chair Mr. Robert Pearce, NASA
4:05 p.m. – 4:30 p.m.	NASA's Potential Contributions to Aviation Security	
4:30 p.m. – 5:00 p.m.	Discussion and Future REDAC/ATAC Activities	Dr. Deborah Boehm-Davis, REDAC Chair Mr. David Swain, ATAC Chair
5:00 p.m.	Adjourn	

**Research, Engineering and Development Advisory Committee
September 30 - October 1, 2002**

Attendance

REDAC Members

Dr. Deborah Boehm-Davis, Chair
Dr. Mike Benzakein
Dr. John-Paul Clarke
Dr. Colin Drury
Mr. James DeLong
Mr. Robert Pearce
Dr. Herman Rediess, Executive
Director

Capt. Chester Ekstrand
Dr. John Hansman
Dr. Joseph Jackson
Mr. John Kern
Mr. John Klinkenberg
Dr. Jerry Creedon
Dr. Dres Zellweger

Mr. Richard Marchi
Mr. John O'Brien
Mr. Neil Planzer
Mr. Ronald Swanda
Dr. Hans Weber
Mr. Amr ElSawy

ATAC Members

Mr. David Swain, Chair
Mr. Mark Anderson
Mr. William Hoover
Mr. Frank Cappucio
Dr. Larry Stotts
Mr. Benji Neumann, Executive
Secretary

Mr. Thomas Brackey
Dr. Aaron Gellman
Dr. John Junkins
Dr. David Crow

Mr. Robert Eckel
RADM Timothy Heely
Mr. Robert Spitzer
Ms. Linda Katehi

Audience

Paul Dykeman, FAA
Chuck Ruehle, FAA
Satish Agrawal, FAA
Dave Smith, FAA
Brad Wacker, FAA
George Marania, FAA
Nick Stoer, NCAR
Chris Seher, FAA
Steve Luckey, ALPA
John Rekstad, FAA
Pat Marsha, GSC
Tom Proeschel, FAA
George Greene, FAA
Phil Carrigan, Raytheon
Edward Gervais, Boeing
Dell Ricks, NASA
Ira Haber, CSSI Inc.
Ed Feddeman, House Science
George Skalotis, DOT/VOLPE
Linda Kateh, Purdue
Paul Fiduccia, SAMA
Sharon Darnell, FAA

Paul Murphy, BAE
Genia Embrey-Brock, FAA
Michelle Rodrigues, SRI
Lyle Malotky, TSA
Dan Kinder, FAA
Bill Marbory, Raytheon
Terry Kraus, FAA
June Green, BAE
Sieg Poritzky, Consultant
Steve Lang, FAA
Fran Chesley, CSSI, Inc.
Ann Joyce, FAA
John Rybka, FAA
Joseph Hetrick, BAE
Karen Stewart, FAA
Tony Freck, GE Aircraft
Robert Spitzer, NASA
Paul Drouilhet, MIT/LL
Dennis Andruch, NASA
James Crook, ATCA
John Williams, DFI
Glenn Smith, NASA

Duane Dupon, FAA
Kenneth Ward, FAA
April Gessner, CSSI, Inc.
Jim White, FAA
Marshall Potter, FAA
Gloria Kulsea, FAA
Jim Washington, FAA
Ken Susko, ASF Corp.
Paul Jones, FAA
Randy Stevens, FAA
Chuck Johnson, NASA
David Slenzak, KHA
Warren Fellner, FAA
Marty Pozesky, MTPA
Walter Hett, WHA
George Price, NASA
Mike Gallivan, FAA
Bill Edmunds, ALPA
Wayne Mackenzie, FAA
Teresa Anderson, JTA
Paul Rich, SAIC
Terry Hertz, NASA

Tom Glissa, FAA
Fritz Policelli, NASA
Jenny Kishiya, NASA
Stephen Moran, Raytheon
Del Freeman, NASA
Robert Ravera, RJA Aviation
Sharon Moreland, FAA
Steven Urlass, FAA
Gisele Mohler, FAA

Bruno Miller, MIT/LL
Clyde Miller, CMA
Joanne Hopkins, SRI
Charles Willib, NASA
Gloria Dunderman, FAA
Raymond LaFrey, MIT/LL
Glenn Roberts, MITRE
Tom Glista, FAA
Paul Rich, SAIC

Aaron Gellman, NWU
John Kopecky, P&W
Don Campbell, NASA
Denise Davis, FAA
Scott Hubbard, NASA
Debra Griffith, FAA
Ed Stevens, Raytheon
Kenneth Leonard, FAA

Mr. John Kern – Air Traffic Services Subcommittee

Recommendations for FY 05 Process

- Include 21st Century Aviation System Initiative as part of the FY 05 Budget Proposal
– This look to the future should not be one time and end in FY 07. This type of activity should be cyclic 5 year programs.
- Construct the FY05 budget in a manner that Aviation Weather Research Program is not in the same line item as the Wake Vortex Research
- FAA should maintain an effective Wake Research program
– Request for FY 05 (and FY 04) should be at or higher than appropriated in FY 02
- FAA should develop criteria for determining when a research project should be dropped

Recommendations

- FAA and NASA should realign internal resources to define the revolutionary air transportation system needed by the US in the future
- FAA and NASA should focus on establishing a continuing process & accountability for technology and associated application knowledge transfer between NASA, FAA, and implementation/ maintenance organizations
- FAA should re-establish its expertise in TCAS. Evaluations of TCAS performance and changes (if needed) are needed by the aviation community. US has lost its technical capability in TCAS and can not provide TCAS evaluations or modifications

Other Suggestions

- FAA and NASA top management take a more visible role in promoting the exploration of future alternative air transportation concepts
- FAA and NASA promote research into highly automated ATC/ATM systems – work with aviation community to establish policy in the level of automation (trust automation to function correctly) acceptable by the NAS user. (repeat of our recommendation of Feb 02)
- Re-establish NAS system engineering and analysis capability within the FAA – across LOB's – needed to design the air transportation system of the future
- Any FAA reorganization thrust should centralize Air Traffic Services research and development planning and resource allocation responsibilities. Current diffused responsibilities make it difficult for the FAA to have an integrated research program to address needed future ATS capabilities.
- NASA FY02 budget cuts hurt research areas addressing the far term ATC/ATM system technology. NASA work is unique in this area. FAA should assist NASA in justifying funding for this area of research.

Subcommittee on Aircraft Safety – Dr. Hans Weber (for Dr. Louis Mancini)

SAS Update

- ❖ SAS overall pleased with safety research portfolio
- ❖ Adding Subcommittee membership from industry for better insight of safety research.
- ❖ Continuing visits to develop familiarity with industry and government research facilities. (CAMI/OKC and GE Engines/Cincinnati in 02...Boeing/Seattle in 03)
- ❖ Strong interaction with sponsors and researchers to improve program direction and content.

Purpose

- ❖ Present current FY02/03 accomplishments/plans
- ❖ Provide SAS program feedback
 - program enhancements
 - future direction

Generic Focus Areas

- ❖ Results-oriented assessments
 - SAS program reviews
 - Results achieved
 - Cost/benefit
- ❖ Periodic review of all research programs for continued relevance and recently started review of total expenditure

FAA Aircraft Safety

Research Scope

- ❖ Addresses the needs of the Regulations and Certification (AVR)
 - Flight Standards Service (AFS)
 - Aircraft Certification Service (AIR)
 - Office of Accident Investigation (AAI)
 - Office of Aerospace Medicine (AAM)
- ❖ Guided by:
 - Congressional mandates
 - Regulatory Program needs
 - Accident investigations and safety recommendations
 - Special studies, e.g., CAST

Comments and Recommendations (Cont.)

- ❖ Support icing R&D portfolio and suggest it should be expanded.
- ❖ While strong AVR sponsorship and support for R&D exists and is essential there must be flexibility for ARA to best optimize Congressional directed funding and initiate longer term research.
- ❖ Recommend AVR continue to seek active, timely involvement of industry in research requirements prioritization process.
- ❖ Continue to pursue matching funds and or “in kind” resources from industry and other sources through Center of Excellence and other partnership modes.
- ❖ Will review CAST and GA JSC research proposals in relationship to current FAA safety priorities at next meeting.
- ❖ Will continue to review research portfolio for relevance and total expenditure investment.

Conclusions

❖ **Implementation of the FAA's influence in safety research by means of the FAA's Aircraft Safety Research Program has:**

- **Leveraged FAA safety research funding**
- **Avoided duplicative and industry-specific research**
- **Stimulated applicable research elsewhere**
- **Encouraged the useful transfer of knowledge between researchers.**
- ❖ **The FAA strongly influences the direction of aircraft safety research being accomplished elsewhere since the results of much of that research are implemented through the FAA as aviation safety regulatory and advisory initiatives.**
- ❖ **Significant accomplishments have been achieved collaboratively with other national and international organizations to support world-wide safe aviation operations.**

SAS: The Bottom Line

We are actively working within the Aircraft Safety research and regulatory communities and look forward to:

- ❖ **Future research program reviews**
- ❖ **Continued interaction with Agency executives**
- ❖ **Adding value to the aviation industry**

Subcommittee on Airports – Mr. Richard Marchi

F/Y 03 Budget Status

- **Administration requested \$16.4 Million as recommended by REDAC**
- **Senate mark-up at requested amount, included Innovative Pavement Research Foundation (\$2 Million)**
- **House mark-up at \$7+ Million**
- **AIP vs F&E continues to be an issue**

F/Y '04 Budget Status

- **F/Y '04 request = \$19.5 Million**
- **Tech Center proposed staffing increase, if budget is increased**
 - **Not endorsed by subcommittee**
 - **Suggest exploring increased use of contract resources to manage additional funding.**

Program Status:

Planning & Design Guidance

- **Originally intended to update old advisory circular**
- **Re-focused program on security concerns in terminal design**
- **Terminal Planning Workshop held in June**
 - **Subcommittee urges rapid dissemination of results through Technical Note.**
- **TSA issue, but they have no expertise.**
- **Subcommittee also urged development of guidance on ADA and wireless issues.**

Program Status:

Taxiway Deviation Study

- **Data collection at JFK delayed**
- **Boeing CRDA underway**
 - **Extreme values analysis**
 - **LHR, FRA, CDG deviation studies will be integrated**
- **Subcommittee recommendations:**
 - **analysis of deviation vs aircraft size**
 - **urges data collection on curved sections**
 - **does not support video tracking of B-747's at JFK**
 - **publication of raw data (as in pavement project)**
 - **expedite program**

Program Status:

Visual Guidance

- **Successfully identified devices and techniques to measure paint quality.**
 - **Urge rapid dissemination through Technical Note.**
- **Reflective bead durability**
- **Fiber optic signs**
- **Lighting control systems**

- IFR Heliport lighting**
- Frangibility standards for signs**
- Lighting at remote airports**

Program Status:

Wildlife Hazard Mitigation

- Radar detection of wildlife (jointly w/DoD)**
- GIS mapping of hazard areas around airports**
- Hazard advisory system**
- Improving bird strike data base**
- Habitat management**

Program Status:

Pavement Research

- Material testing lab**
- Complex wheel configurations**
- Pavement roughness**
- Mix design**
- High pressure tires**
- Non-destructive testing techniques**

Program Status:

Advanced Taxiway Guidance

- AT not willing to switch lights**
- Program discontinued**
- Subcommittee not concerned**
- CDTI, moving map, ADS-B, multilateration**
- Urge continuation of lighting control research**
- Urge close coordination with AND, runway incursion program**

Program Status:

ARFF

- Reducing rollovers**
- Replacement firefighting foam**
- Conductivity meters vs refractometers to assess foam mixture**
- Reconsider emphasis on externally generated research topics:**
 - Interior intervention vehicle**
 - “Phoenix/Raven” multi purpose fire vehicle**
 - “Rhino” foam turret**

Program Status:

ARFF

- Proprietary systems**

–**Raven/Phoenix**

–Interior intervention vehicle

–“Rhino” high flow turret

- Urge development of objective requirements by program sponsor (AAS)

Program Status:

Surface Operations

•“Fate of glycol” funding eliminated, subcommittee not concerned... external CRDA

•Need corrosion/environmental standards for deicing chemicals... existing not adequate.

–Lighting systems/aircraft corrosion (FAA AD)

–Toxicity/oxygen demand

•Winter traction: initiate FOQUA

•Soft ground arrestor

–Arctic conditions

–Small airplane demo

–EQUIVALENCY!

General Recommendations

•Preliminary support of F/Y '05 program.

•Increase use of peer review

–Used successfully in pavement program

–**Expand to all research: experiment design, progress, results.**

•**Accelerate dissemination of results through Technical Notes**

•**Improve program requirements definition**

•**Publish all raw data on Internet**

–As in pavement program

•**Consider airport research requests**

Subcommittee on Environment and Energy – Dr. John-Paul Clarke

Questions

- In what areas should we be investing RE&D funds?
- In what area(s) are we investing that we should not be?
- Are the program priorities correct?
- If not, then what should the priorities be?

Committee Activities

- August meeting at FAA HQ
 - FY-02 appropriations
 - FY-03 budget & Senate marks
 - FY-04 programs & priorities
- E-mail discussions

FY-02 Appropriations

- OMB budget for AEE was \$7.679M
- Congressional appropriation was \$22.081M
 - \$20M earmark for NASA noise research
- Final allocation
 - \$4.0M for AEE
 - \$18.1M for NASA noise research
 - Lengthy disbursement delay due to negotiations
- Significant impact on AEE programs
 - Combined impact of budget cut and disbursement delay

FY-03 Budget & Senate Marks

- OMB budget for AEE is \$7.7M
- Senate mark is \$2.7M
 - Budget constraints cited as reason for mark down
 - Only FAA RE&D line item that was marked down
- Detrimental impact on AEE programs
 - Ability of US to negotiate in ICAO will be compromised!
 - Drastically diminishes FAA's ability to fulfill environmental mission.
 - Halts all research into the cause and effect of aircraft noise exposure.

FY-03 Budget & Senate Marks

- Even more detrimental impact on AEE programs
 - Eliminates Center of Excellence for Aircraft Noise Mitigation.
 - Delays in model development to forecasts emissions problems will:
 - » Reduce FAA's long-term effectiveness in various forums.
 - » Cedes the emissions debate to the Europeans.
 - Engine emissions research with NASA will be severely curtailed
 - Improving efficiency of the engine exhaust emissions certification requirements will be severely curtailed - increasing costs to manufacturers

FY-04 Programs

- Budget programs are appropriate.
- No additional areas need to be considered.

- Relative ranking of noise programs and emissions programs (within each respective categories) are appropriate.
- However, the committee wanted to integrate the noise and emissions programs into a single priority list.
- That exercise resulted in a set of recommended priorities for the environment and energy research program.

FY-04 Priorities

- Critical Priority
 - EDMS (emissions dispersion model) development
 - Aircraft noise analysis
 - INM development
 - SAGE (global emissions model) development
 - Emissions and dispersion modeling assessment methodology
- High Priority
 - Particulate Matter (PM) study
 - Noise certification analysis
 - MAGENTA (global noise model) development
 - Joint noise database development
 - Center of Excellence

FY-04 Priorities (cont'd)

- Medium Priority
 - Emissions characterization & assessment
 - Forecasting emissions inventories
 - Airspace noise assessment methodology
 - Engine emissions certification analysis
 - Engine emissions certification guidance
 - SAE validation project
 - Noise certification guidance
 - FICAN support

Recommendations

- The REDAC should:
 - Support full funding of AEE as defined in the OMB budget
 - »This should be the minimum funding level!
 - Support augmenting AEE funding by another \$15 M to \$20 M to accelerate the noise research with NASA

Answers

- What areas should FAA invest its RE&D funds?
 - The current areas are appropriate
- In what area(s) are we investing that we should not be?
 - N/A
- Are the program priorities correct?
 - Yes, but the noise and emissions priorities needed to be integrated into a single list
- If not, then what should the priorities be?
 - N/A

Subcommittee on Human Factors – Dr. John Hansman

Committee Activities

- **August Meeting at Boeing - Renton WA**
- **Review of Air Transport Human Factors Research Program**
- **HF Member Participation in other Committees**
 - Safety
 - ATS
- **e-mail discussion**

Questions for Sept. Meeting

- **In what areas should FAA invest it's R,E&D Resources**
 - Areas where not investing but should be
 - Areas where investing but should not be
- **What should be the priorities among the areas where FAA should be investing**
- **How can we get better visibility on our research programs?**
- **Process**
- **Additional Guidance and Recommendations**

Air Transport Review

- **Generally good work**
- **Could be more forward looking**
- **Committee reviewed the Simulator Fidelity Requirements – Motion study and found the study of outstanding scientific quality and integrity. It is the hope of the committee that the results of the study will be incorporated in future simulation training specifications to identify which training activities or maneuvers may or may not require motion cues.**
- **Concern that voluntary safety reporting programs commonly designed for flight (such as ASAP) are not effective for maintenance and dispatch. Need to evaluate and correct**
- **Others?**

Portfolio Content

Areas of Over-Investment

- **Some sense of over-investment in research supporting the Advanced Qualification Program (AQP)**

Portfolio Content

Areas of Under-Investment

- **Distributed Air-Ground Integration Issues**
 - Human Roles and Responsibilities
- **Second Generation Information Integration/Automation Issues**
 - Interaction of Multiple Systems
 - Decision biasing by automation
 - Automation reliance (checklists, alerts)
 - Lack of non-automated experience (issue for degraded modes or
- **Opportunity to use increasingly available data to define objective measures of performance**
 - Baseline measures of nominal performance
 - Meta-Analysis techniques to protect individuals and organizations and make data less sensitive
- **Continuing need for investment in longer range issues (i.e. Past OEP)**

Interaction with ATS Committee

- **Cross-member participation**

●Joint Recommendation on Transition

–Need to look in depth at the historical record and problems of transitioning technology/new functionality into existing NAS. Are there attributes to look for in a new research area that would point to a likely successful transition (if it could be developed) into operation (operational acceptance)

Additional Guidance, Recommendations and Issues

●Need for enhanced up-front mission analysis and investment analysis activities in the development of the FAA acquisition activities.

–Holistic systems analysis

–Human roles and responsibilities

–Information Requirements and Flows

–Operating Environments

–Procedures and Operating Rules

●Should be part of the risk management strategy which is key to the investment analysis strategy.

●Must be identified early

●Requires resources

–People money and time

Process

●Concerns Regarding Sponsorship Process Model

–Sponsorship Obligation viewed as “Un-funded Mandate” by some performing organizations

–Dependant on individuals to identify and articulate needs

»Individuals often consumed by near term issues

–Lack of research infrastructure or culture

●Research organization should have some capability to sponsor or define research needs

●Committee notes the progress which has been made in including HF considerations, staffing and resources in the acquisition process

●Encourage R&D orgs to continue to look outside for new research orgs, ideas or capabilities. Risk of stagnation



Attachment 4

Dr. Deborah A. Boehm-Davis
Chair, Research, Engineering and Development Advisory Committee
Professor of Psychology, George Mason University, 4400 University Drive, ARCH Lab
MSN 3F5, Fairfax, Virginia 22030-4444

December 3, 2002

The Honorable Marion C. Blakey
Administrator
Federal Aviation Administration
800 Independence Avenue, SW
Washington, DC 20591

Dear Ms. Blakey:

On behalf of the Federal Aviation Administration (FAA) Research, Engineering and Development (REDAC) Advisory Committee, let me welcome you to the FAA. The Committee members look forward to discussions with you and they hope that you will be able to join us for our next meeting, which will be scheduled for some time in April.

On the basis of our meeting, we recommend the following.

- That FAA and NASA realign their internal resources to define the revolutionary air transportation system needed by the US in the future. This process should culminate in the development of national goals for the airspace and benchmarks that can be used to assess when those goals have been achieved. Such a vision and set of benchmarks could be used to leverage research funding. Further, there is a great need for investment in longer-range issues (that is, past OEP) that can only come from a longer-range vision of the national airspace.
- That FAA and NASA focus on establishing a *continuing* process & mechanism for accountability for technology and the associated applications knowledge transfer between NASA, FAA, and implementation/maintenance organizations.
- That Associate Administrators attend meetings with the REDAC Committee to describe how they see the research and development process fitting into their operations and to outline their strategic plan for incorporating R&D into their programs. Specifically, the Committee would like the administrators to articulate their research needs and describe how they prioritize work and manage their programs. Although this recommendation was made in the past, few Associate Administrators have attended REDAC committee meetings.
- That FAA develop and circulate criteria for determining when a research project should be dropped.

In addition to these general recommendations, five of the six subcommittees made a number of recommendations that have been approved by the committee to be sent forward. Those recommendations are presented in the attachment. The sixth committee, the Security Committee,

declined to present recommendations until such time as the TSA research program is available for evaluation.

I am interested in discussing these proposals with you at your earliest convenience. The Committee continues to be dedicated to providing you with advice and recommendations on any R&D issue that you may need us to review. We stand ready to serve you. Please contact me at (703) 993-8735 or at dbdavis@gmu.edu if you have any questions or would like to meet.

Sincerely,

Deborah Boehm-Davis, Ph.D.

Chair

FAA Research, Engineering and Development Advisory Committee

Attachment
REDAC Subcommittee Recommendations

Subcommittee on Aircraft Safety

- We support the following research programs that have been funded:
 - FAA Cabin Air Quality R&D initiatives and the strong linkage to the work being done at TSA in aircraft toxicity detection and elimination.
 - FAA's proactive research with respect to the application of advanced materials and manufacturing processes in aircraft primary structures and for fire resistant cabins.
 - FAA aircraft safety R&D planning for security-safety system integration of possible TSA security R&D hardware and procedures.
- We strongly recommend FAA form an airline industry/FAA partnership that uses airline safety officers to build a risk analysis safety data system to improve upon FAA's SASO approach.
- We are concerned that NASA's movement of safety initiatives to security "sponsorship" will take these efforts out from FAA and industry review, reduce resources for safety, and have negative safety implications.

Subcommittee on Airports

- We recommend using Technical Notes to rapidly disseminate research findings to airports (e.g., Terminal Planning Workshop and Paint Reflectivity Measuring Research). This will get important information out to airports sooner than is currently the case.
- We recommend expediting taxiway deviation studies and analysis of the data generated.
- We recommend that the FAA *not* increase FTE staffing in the Airport Technology Program at this time. If substantial increases in the funding for this program require additional project management resources, the need should be met by contract personnel until it is clear that any higher funding levels are permanent and warrant a permanent increase in staff.
- In reviewing the research program, we recommend that the FAA provide research summaries and data in advance of subcommittee meetings and make increased use of peer review to manage the research program.

Subcommittee on Air Traffic Services

- We recommend including the 21st Century Aviation System Initiative as part of the FY 05 Budget Proposal. This look to the future should *not* be one time and end in FY 07; rather, it should become a cyclic 5-year program.
- We recommend that the FY05 budget be constructed such that the Aviation Weather Research program is not in the same line item as the Wake Vortex Research program.
- We recommend that the FAA request for the Wake Research program for FY 05 (and FY 04) should be at or higher than appropriated in FY 02 to maintain an effective program of research.

- We recommend that the FAA re-establish its expertise in TCAS. The U.S. has lost its technical capability in TCAS and cannot currently provide needed evaluations of TCAS or of modifications to TCAS systems.

Subcommittee on Environment and Energy

- The subcommittee feels that the budgeted FY 04 programs are appropriate and that no additional areas need to be considered. However, the committee did support augmenting AEE funding by another \$15 M to \$20 M to accelerate the noise research with NASA.
- Although the committee felt that the relative ranking of noise programs and emissions programs (within each respective categories) were appropriate, we wanted to integrate the noise and emissions programs into a single priority list.
- The committee has provided a set of recommended priorities for the environment and energy research program.
 - Critical Priority
 - **EDMS (emissions dispersion model) development**
 - **Aircraft noise analysis**
 - **INM development**
 - **SAGE (global emissions model) development**
 - **Emissions and dispersion modeling assessment methodology**
 - High Priority
 - **Particulate Matter (PM) study**
 - **Noise certification analysis**
 - **MAGENTA (global noise model) development**
 - **Joint noise database development**
 - **Center of Excellence**
 - Medium Priority
 - **Emissions characterization & assessment**
 - **Forecasting emissions inventories**
 - **Airspace noise assessment methodology**
 - **Engine emissions certification analysis**
 - **Engine emissions certification guidance**
 - **SAE validation project**
 - **Noise certification guidance**
 - **FICAN support**

Subcommittee on Human Factors

- The committee raised several concerns about the sponsorship process model used to develop funding priorities. First, the sponsorship obligation is viewed as an “unfounded mandate” by some performing organizations, which are often consumed with near-term issues. Second, the model is dependant on individuals to identify and articulate needs. Finally, the research organization should have some capability to sponsor or define research needs.
- The committee recommends an initiative to look in depth at the historical record and problems of transitioning technology and/or new functionality into the existing NAS. The goal of this project would be to identify whether there are attributes to look for in a new research area that would point to a likely successful transition (if it could be developed) into operation (implying operational acceptance).

- The committee feels there is a critical need for enhanced up-front mission analysis and investment analysis activities in the development of the FAA acquisition activities. This should include a holistic systems analysis, to include information on human roles and responsibilities, information requirements and flows, operating environments, and proposed procedures and operating rules.
- The committee believes there is an opportunity to use increasingly available data to define objective measures of performance. We recommend that data be used to define baseline measures of performance. Further, we recommend that meta-analysis techniques be used to evaluate new systems and procedures as these techniques can protect individuals and organizations.